

and fringed with level plains, and these are again covered with vegetation.

This though composed of the same or similar genera as that of the preceding periods is far more luxuriant. Dark humus accumulates during long periods of undisturbed growth, until a river flood, or another rise of the lake covers it with mud. This being again exposed, the process is repeated, until by slow degrees, and after many oscillations of rise and fall, many successive Coal seams one above the other, each with its foot-clay, and roof of shale or sandstone, are buried beneath the waters, and the production of coal in these regions is ended.

For once more, and for the last time, the lake has encroached greatly and rapidly upon the shore, and its waves once again beat directly upon the sloping bases of the hills.

The same vegetation still clothes the land, but there are no levels in which its debris can accumulate, and what woody matter is washed down into the water is soon comminuted by the constant shock of the shore waves. The never ceasing erosion of the land, continued centuries after centuries, perseveres in lowering the mountains into an undulating land, with its eastern and northern slopes dipping below the sandy shores of the lakes. For vast beds of sand formed from the waste of the continent, swept down into the lake by rivers, and transported by the shore wash to right and left of their mouths, have now silted up with a final deposit, (the coping stone as it were of the whole building), all the series of rocks whose formation we have been witnessing in imagination.

This is the commencement of the Hawkesbury Period.

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PRELIMINARY NOTE ON AN AUSTRALIAN SPECIES OF *Phoronis*  
(*Gephyrea* 'Tubicola.')

BY WILLIAM A. HASWELL, M.A., B.Sc.

The aberrant genus *Phoronis*, whose remarkable relations to the *Gephyrea* on the one hand, and to the *Entoproct Bryozoa* on

the other render it one of the most interesting of the 'Vermes,' has hitherto only been observed in European seas. The present species, which I propose to name *P. australis*, was obtained on two occasions during the dredging work carried on under the auspices of the Trustees of the Australian Museum, at a depth of fifteen fathoms off Ball's Head, in Port Jackson. It differs very widely from its European congener in the nature of its shelter. A number of individuals inhabit a large irregular semi-gelatinous sac, about six inches long and three or four wide, and open at both ends. The walls of the sac, which are about  $\frac{1}{4}$  to  $\frac{1}{2}$  an inch in thickness, and are tolerably tough, are composed of numerous fine threads closely felted together, and in these walls, in wideish irregular spaces among the felted threads, lie the worms, the head projecting externally; the inner surface of the sac is lined by a dense glistening layer of the same material as the rest. The whole substance of the sac is of a purple colour.

The worm presents a cylindrical body, sometimes as much as two and a half inches in length and an eighth of an inch in thickness, and slightly dilated at the hinder end. The head bears a crown of slender filiform ciliated tentacles two-thirds of an inch in length and some hundreds in number, borne on a lophophore, which is continuous behind, but divided in front, the two limbs each becoming rolled on itself in a series of three and a half spiral turns. The lophophore is vertically ribbed, the ribs being continuous with the tentacles, into which the lophophore is, as it were, frayed out. The front portion of the body, together with the tentacles, is of a dark purple; the hinder portion is reddish, owing to the blood-vessels shining through. Numerous embryos were found enclosed in the spiral of each half of the lophophore. The stages observed do not materially differ from those of the European species, but I have not yet succeeded in finding fully-formed *Actinotrochæ*.

The movements of the animals were exceedingly sluggish, a peculiarity wherein it differs very markedly from the European

species, which is described as retracting itself when disturbed with extreme rapidity into its tube.

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NOTE ON A CURIOUS INSTANCE OF SYMBIOSIS.

By WILLIAM A. HASWELL, M.A., B.Sc.

In the June before last I obtained with the dredge off Thursday Island, in a depth of four or five fathoms, specimens of a branching species of *Cellepora*, which was dotted over with small red specks. On examining these more minutely, I found each to consist of a minute *Actinid* lodged in a cylindrical pit excavated in the substance of the polyzoarium and projecting, when expanded, about a quarter of an inch from the surface of the latter. Each of the pores is about a twentieth of an inch in diameter; they are cylindrical and tolerably smooth, and in most cases the orifices are furnished with a low projecting rim. When they are traced backwards into the substance of the *Cellepora* two are frequently found to unite, and very often they eventually open into the cavity occupying the centre of the thicker branches. They very often extend in this way through a distance many times greater than the length of the *Actinid* itself, and, as the latter is provided with no means by which it can retract itself into the interior, this long canal must be the result of the simultaneous growth of the little anemone and the *Cellepora* in which it is lodged.

This singular phenomenon is specially interesting on account of the light which it throws on the structure of some very problematical-looking species of Bryozoa, one of which I described not long ago under the name of *Sphæropora fossa*.\* In this species the bryozoarium is spherical, slightly compressed, one pole being

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\* Mr. Waters, whose authority on the subject of Bryozoa is probably as great as that of any living zoologist, regards the form of the cells as not being sufficiently distinctive to justify the separation of this species from *Cellepora*.